

Technology Use in Speech-Language Therapy with Children

An Honors Thesis (HONR 499)

by

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Thesis Advisor

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A handwritten signature in black ink, appearing to read "Amy Fritz-Ocock, CCC-SLP". The signature is stylized with loops and a cursive-like flow.

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Speech-language therapy is common for many children, and technological advancements have had an impact on the therapy approach used by many speech-language pathologists. As the use of technology becomes more common among adults and children, many uses of technology have been identified. This document specifically explores the use of popular, commercially-available technology devices in speech-language therapy with children and the impact that they have on their motivation and engagement. Technology use will not be appropriate for every child, and this document also discusses how to determine what is appropriate and how to implement technology into a speech-language therapy program.

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Technology Use in Speech-Language Therapy

Speech-language therapy is vital for many children across the nation, and technological advancements have changed the way that many speech-language pathologists approach therapy. Today's culture is being transformed by technological advancements as individuals gain more knowledge about the possible uses of different types of technology. As technology advances, new doors are opened for various methods of speech-language therapy. Some speech-language pathologists may prefer more traditional, technology-free forms of therapy, while others prefer to mix the traditional methods with the technologically advanced methods. Teenagers and adults are not the only individuals who have taken an interest in technology; children are often seen with technological devices in hand as well.

Technology is commonly used by children for a variety of tasks. Some children use different forms of technology solely for playing fun games, but many are learning to use the technology available to them for interactive and informative activities or for use in educational settings. Although some may be skeptical of placing technology in the hands of children, the devices have had a positive impact on many. While technology has previously been considered a hindrance to learning language, it can now be used to teach concepts in a motivational and engaging manner (Fernandes, 2011). Jean Piaget, a psychologist who has studied the intellectual and cognitive development of children, developed a theory about the stages of intellectual development that also supports the benefits of technology use with children.

The first period of development according to Piaget (1973) is the period of sensorimotor intelligence, which is descriptive of children from birth until the development of language; this period generally includes the first two years of the child's life. The period of sensorimotor intelligence emphasizes reflex exercises, first habits, coordination of vision and movement, and

the discovery of new means. Children today tend to be drawn to colorful images and music, which they can explore using their sense of touch (DeCurtis & Ferrer, 2011). Gross and fine motor movements are also used as children handle the technology. As stated by DeCurtis and Ferrer (2011), “the cumulative motor movements provide access to stimulating activities which offer immediate sensory and cognitive stimulation” (para. 6).

The second stage of development theorized by Piaget is the period of preparation and of organization of concrete operations, which is the period of a child’s development from age two until eleven or twelve years of age (Piaget, 1973). This stage is divided into two subperiods, the first being the preoperational. The preoperational stage involves symbolical function in the context of language and play (Piaget, 1973). Sensory input is an important form of learning for young children, making technology a motivational object for them (DeCurtis & Ferrer, 2011). DeCurtis and Ferrer (2011) observed that the use of tablet computers has been beneficial for children’s communication skills, especially among the areas of joint attention, turn-taking, sound/picture association, and following directions.

The concrete operations subperiod is the second subperiod of the period of preparation and organization of concrete operations (Piaget, 1973). This subperiod consists of the organization of concrete operations of categories, numbers, and relationships, including categorizing abilities and coordination of perspectives. Various forms of technology provide programs for children involving categorization, sequencing, and perspective-taking in a fun, engaging manner. Some programs may be disguised in the manner of a fun game, such as the app for the Apple iPad known as “Monkey Preschool Lunchbox,” which includes matching and categorizing activities. Others may be more obviously aimed at working on a particular skill, such as “Sequencing with Milo,” which involves placing photos in the correct order. After

placing the photos in order, a short video can be played, providing the child with a visual reinforcement for the proper sequence.

When encouraging the development of language, instructors should consider that children learn in different ways (Campbell & Jane, 2010). Language development can be encouraged through a combination of “enriched learning experiences which include visual, auditory, small and large group aspects” (Campbell & Jane, 2010, p. 4). Technology can accommodate and engage a wide variety of children with various learning styles due to the characteristics of technological devices. The learning style of a student affects his or her ability to learn in different ways; the three most well-known learning styles are auditory, visual, and kinesthetic (Vincent & Ross, 2001). Individuals of all ages can typically be identified with one of these three major learning styles, and speech-language pathologists will typically benefit from taking the learning styles of their clients into account when planning therapy activities. For example, a therapy activity involving only auditory information will likely be difficult for a child who is primarily a visual learner. While the more traditional, technology-free methods of speech therapy may be difficult for speech therapists to plan because of the different learning styles of the children with which they are working, the multiple functions and uses of many technological devices may be beneficial when planning speech-language therapy due to the possibility of accommodating different learning styles with a single device.

Auditory learners tend to retain information best when it is presented to them verbally (Vincent & Ross, 2001). They tend to learn by listening to information and repeating it, and they usually problem-solve by talking through the problem. In school settings, auditory learners generally like discussions in the classroom, but distractions may be very likely; they are often very talkative (Vincent & Ross, 2001). Teaching strategies to assist individuals who are auditory

learners include providing verbal reinforcement, group activities, and discussions (Vincent & Ross, 2001). These students also benefit from reading out loud in class and creating songs and/or poems to help them remember the information they are learning (Vincent & Ross, 2001). Technology use can be beneficial for auditory learners because many types of technology that can be used in speech-language therapy have the ability to provide verbal instructions and feedback, as well as opportunities for children to work with their classmates and have discussions with one another.

Another common learning style consists of those individuals who learn best by seeing images, reading, and watching (Vincent & Ross, 2001). Visual learners often think of images to accompany auditory information and tend to have vivid imaginations. Those who have this learning style tend to be quieter in the classroom and often need to have a visual image in order to understand a concept (Vincent & Ross, 2001). Video equipment, photos, charts, and colorful displays tend to be helpful for a visual learner to have in the classroom (Vincent & Ross, 2001). Many technological devices have video-recording and picture-taking capabilities, which can also enhance the learning environment for visual learners. In addition, speech-language pathologists can easily access colorful applications that will be engaging for the visual learner and can assist him or her in retaining the information learned during the therapy session.

The third common type of learning style consists of individuals who learn best by doing or feeling (Vincent & Ross, 2001). Kinesthetic learners learn best through the tactile sense and benefit from hands-on activities (Vincent & Ross, 2001). Physical movement and short breaks throughout the therapy session will be beneficial for individuals who are kinesthetic learners (Vincent & Ross, 2001). Use of technology will be beneficial for tactile learners because many

of the technological devices can be held by the children, while others involve movement from their seats to participate in the technology-based activity.

Technology has become an important part of many peoples' lives, both in the workplace and at home. As a result, individuals need to learn how to use technology appropriately in order to be more successful in the future. By using technology with children when they are young, they will become proficient with it by the time they need to use it in the working world. Therefore, speech-language therapy tasks using technology will help teach children technology skills that will be essential in the future in addition to increasing their engagement and motivation.

Engagement and Motivation

The challenge with children is often developing ideas for integrating technology in ways that will engage students and encourage critical thinking (Couse & Chen, 2010). Annemarie Nichols, M.A., CCC-SLP, has observed that many children become excited when they see the mobile technology, and she stated that "with increased motivation comes increased speech production" (personal communication, March 11, 2013). Nichols has been a practicing speech-language pathologist for approximately four years and is currently an Augmentative and Alternative Communication (AAC) specialist who provides speech-language therapy services for children. Speech-language pathologists have been quickly adopting technology for use in therapy, which "has transitioned our profession to the 21st century where we use technology as a tool to provide interactive and contextualized speech and language therapy" (Fernandes, 2011, p. 35).

When considering the impact of technology on children's engagement, speech-language pathologists should realize that attention is a learned behavior that is shaped by an individual's

values (Davidson, 2011). In the case of children, many have the same values as their primary caregivers, which will affect how they direct their attention. Caregivers begin to teach children how they should focus their attention while they are infants, and circumstances may cause a change or reshaping of values over time (Davidson, 2011). This suggests that children who have found technology engaging since they were very young will most likely be attentive when using technology. Conversely, children who are in situations in which technology is being used for the first time are likely to shift their attention to the technology because it is new and exciting for them. Therefore, technology is engaging for many children, regardless of their history of using technology.

Technology can be used in speech-language therapy sessions as a therapy tool, reinforcement, or both. Brian Butz, M.A., CCC-SLP, has been a practicing speech-language pathologist for approximately 15 years and has worked with children for the majority of those years. He, along with other speech-language pathologists, have noted that technology is very engaging for children and often helps motivate them to complete therapy tasks (B. Butz, personal communication, March 22, 2013; A. Nichols, personal communication, March 11, 2013). In addition, a study performed by Campbell and Jane (2012) found that children were highly motivated and engaged when working on tasks involving technology. The children expressed their satisfaction upon completing a task, difficulties they experienced, and their excitement about using technology. When faced with difficulties, the children persevered to accomplish the task despite any frustration they were experiencing (Campbell & Jane, 2012).

Children become interested in learning when a payoff is involved; they tend to find an increase in confidence and understanding more of a payoff than statistical achievements, such as high test results (Davidson, 2011). Campbell and Jane (2012) found that “‘personal satisfaction’

was of high importance to nearly all children” (p. 8). An increase in self-confidence and understanding will give children more optimistic views for the future and will give them the confidence needed to persevere when faced with challenges (Davidson, 2011). When children are challenged during speech-language therapy sessions, the self-confidence they have formed and the excitement they feel when using the technology will help to encourage them to work through difficulties.

Hands-on activities are also engaging for children, and well-planned hands-on activities should be incorporated into a quality program (Campbell & Jane, 2012). As stated by Couse and Chen (2010), “engagement in the learning process is directly linked to motivation” (p. 76). By implementing technology in a speech-language therapy program, the speech-language pathologist is providing an engaging, motivational, hands-on activity for the children with whom he or she works. Many forms of technology are available, and each form provides multiple possibilities within the therapy room. Interactive Whiteboards (such as a Promethean ActivBoard) and various forms of mobile technology (such as the Apple iPad) are examples of technology types that may be seen in therapy rooms.

Interactive whiteboards have replaced dry erase boards and chalkboards in many classrooms, and they provide many features that cannot be utilized with basic chalk or dry erase boards (Schrum & Levin, 2009). An interactive whiteboard can be used for numerous types of activities, resulting in the availability of age-appropriate information for a wide variety of ages. Children have the ability to interact with the information presented on the whiteboard, which increases student engagement and provides benefits for children with various learning styles (Schrum & Levin, 2009).

Promethean's interactive whiteboard systems were designed to help focus the attention of students as well as to "create an engaging and interactive learning experience" (Promethean, n.d.). Promethean interactive whiteboards can be used for individual speech-language therapy or for therapy sessions involving multiple students. The interactive whiteboards can be used for many activities that could also commonly be done using a pencil and paper. However, the whiteboards provide an additional incentive because the students can leave their seats to participate in the activity. Interactive whiteboards give children the opportunity to interact with one another throughout the activity as well.

Promethean also has ActiVote systems that can be purchased for use with the interactive whiteboard (Promethean, n.d.). The voting system can be used to engage all students when implementing therapy with a small group. Children can use the ActiVote system to vote on whether the productions of their peers are correct or incorrect; not only does this engage all of the children, but it also helps the children learn to distinguish between correct and incorrect sound productions (B. Butz, personal communication, March 22, 2013). Understanding the difference between a correct and incorrect sound production will help a child produce the sound correctly when developmentally appropriate (Dougherty, n.d.)

Another form of technology that has become increasingly popular is the Apple iPad, which has been adopted for use in many school systems. They are "game changers not only for speech therapists, but for parents, educators, and, most important, children" (Fernandes, 2011, p. 35). Apps can be purchased through the Apple App Store to address many speech-language therapy concerns, such as articulation, language, fluency, and voice (Fernandes, 2011). In addition, many games available in the Apple App Store can provide excellent reinforcement for therapy activities. Although many apps are beneficial for therapy, the iPad also comes with

many features that can be utilized for therapy, such as a video recorder, camera, and FaceTime. The front-facing camera and video recorder on the iPad can be used in place of a mirror to provide visual feedback for the child (Fernandes, 2011). In addition, photos can be taken on the iPad and used to encourage conversation and discussion among students. Brian Butz has found FaceTime to be an exciting, engaging tool for children. Children can be separated into two groups, each with an iPad; the two groups then go to different areas and communicate with one another using the iPad (personal communication, March 22, 2013).

An iPad can be a useful tool for many different types of therapy, and it can also be used as a cost-effective augmentative and alternative communication device. Glenda Watson Hyatt, a web accessibility consultant and user of augmentative and alternative communication (2011), was given the diagnosis “cerebral palsy athetoid quadriplegic” when she was born (p. 24). She noted using the iPad for augmentative and alternative communication and her appreciation of others’ acceptance of the device. She attributed the acceptance of the device to the fact that an iPad is a recognizable form of technology rather than a device that caused her to appear different from others. As stated by Hyatt, “technology is finally catching up to my needs” (Hyatt, 2011, p. 26). Newton and Dell (2011) noted that many educators own and know how to use mobile devices, which increases their willingness to help their students obtain the devices for communication purposes. Students then accept mobile technology devices because they allow students to use the same devices as their peers while also receiving the benefits of an assistive technology device (Newton & Dell, 2011). Many different types of augmentative and alternative communication devices are available; the iPad is one of many. Therefore, the therapist should research which type of augmentative and alternative communication device will be the best for

each individual, taking into account the individual's motivation and concerns regarding the opinions of others.

Motivation may be either extrinsic or intrinsic. Intrinsic motivation may be motivated by external factors and allows students to experience a sense of satisfaction upon the completion of a task (Campbell & Jane, 2010). Many therapy activities using technology allow for the therapist to give children an opportunity to make choices about the therapy and/or reinforcement activities. Campbell and Jane (2010) found that "choice and self-direction enhance intrinsic motivation" (p. 4). By allowing children to make choices regarding their therapy lessons, the likelihood that they will be interested in the task increases, which is helpful for motivation and engagement.

Determining Appropriateness of Technology Use

An important consideration when implementing technology in an educational setting is how the technology should be used and what is developmentally appropriate for the children. Many educators today are determining how to use technology with children rather than making the decision of whether to use it (Couse & Chen, 2010). Just as every individual child is different, not all children will react the same way to the use of technology in therapy sessions. While some may experience many benefits from technology use, others may work better with more traditional forms of therapy. The method that is best for each particular individual should be pursued; one must remember that speech-language therapy should be centered on the individual for whom therapy is being provided, regardless of the preferences of the therapist.

Couse and Chen (2010) inquired about the use of technology with young children, and found that many educators indicated that incorporating technology was important. However, the age at which they believed the technology should be implemented varied from one educator to

another (Couse & Chen, 2010). The age at which technology should be implemented into a speech-language therapy program is at the discretion of the speech-language pathologist and should be based on the individual needs of each child. Some children may respond very well to technology at a young age, while others may require additional time before adding technology to their therapy sessions (if it is determined that technology will be beneficial for them in the future).

Technology is a very useful tool for many students, but speech-language pathologists should continue to use their best judgment about what is most appropriate for each individual child. A useful therapy tool should provide for the needs of the child and assist him or her in accomplishing tasks; the data found during a student's individual therapy sessions will often support or refute the benefit of using technology with that particular child (Newton & Dell, 2011). If the speech-language pathologist is using technology during therapy and sees that the client's accuracy is improving, then the technology may be benefiting that child. Likewise, if the speech-language pathologist sees that a child's accuracy declines when using technology, then it may not be the best therapy method for him or her.

Some individuals with communication disorders and learning disabilities may benefit from technology use in therapy, while others may have trouble focusing on the therapy task when technology is being used. According to DeCurtis and Ferrer (2011), technology use "has shown to be effective in building speech, language, and social skills with a wide array of our clients' communication disorders, such as autism spectrum disorders, down syndrome, specific language impairment, auditory processing disorders, and apraxia." Although some speech-language pathologists have reported benefits of using technology with children who have communication disorders, one must be sure to remember that not all children with those

particular disorders will benefit from technology use. For example, Brian Butz, M.A., CCC-SLP, has found that while technology may be very appropriate for some children with autism, others may become overstimulated and perseverate on the technology use (personal communication, March 22, 2013).

A common concern among teachers and parents is the possibility of too much technology use (Walton-Hadlock, 2008). Use of technology with children should be meaningful and should include interactions with others. In addition, it should not replace personal interactions and play, and time limits should be enforced (Walton-Hadlock, 2008). When determining the length of time appropriate for a child to use technology, one must remember that the quality of the time spent using the technology is more important than the quantity of time (DeCurtis & Ferrer, 2011). Children today are often known for spending a lot of time watching television or using technology while being inactive. Therefore, children should also be taught the difference between using technology for fun and using technology to learn. If children feel that they are only using technology for fun, then the therapy sessions will not be as beneficial as they would be if they understand that the technology is being used to help them learn.

Gary Dunham, Ph.D., director of publications for the American Speech-Language Hearing Association (ASHA) and Editor-in-Chief of the ASHA Leader, noted that “at least one of every five peers and patients with whom an SLP interacts daily is using a handheld mini-computer” (Dunham, 2011). The increasing popularity of mobile devices opens up additional possibilities for engaging activities with clients. Additionally, the widespread use of mobile devices that can double as therapy tools can increase carryover possibilities when used responsibly and knowledgably (Dunham, 2011). Mobile devices are also practical tools for

speech-language pathologists and parents to use for speech due to the ease of transporting the device when compared to many other therapy materials (Dunham, 2011).

The use of technology does not change the overall goal of speech-language therapy; the speech-language pathologist should consider the best way to engage the child and provide appropriate opportunities to achieve his or her goals (B. Butz, personal communication, March 22, 2013). Many technological tools are available that may be helpful for children, but the appropriateness of the tool is crucial. Technology use in therapy is not intended to replace important tactile methods of learning or take the place of face-to-face interactions with others, but is meant to supplement those methods and interactions (DeCurtis & Ferrer, 2011).

Technology Implementation

Implementing technology into speech-language therapy takes time and dedication. An educator's confidence in using the technology he or she plans to implement has an influence on the effectiveness of technology implementation (Christensen, 2002). Brian Butz indicated that the first step when implementing technology in speech-language therapy is that the speech-language pathologist should familiarize oneself with the technology he or she would like to implement and determine how it can best be used in therapy for the children with whom he or she works (personal communication, March 22, 2013). Familiarizing oneself with technologically advanced methods of speech-language therapy will help a speech-language pathologist implement the best therapy tasks possible for the children during the time that is available to them.

Technology training prior to implementation with children is also beneficial (Christenson, 2002). The speech-language pathologist will be more knowledgeable about the technology he or she will be using and will be more comfortable using it with children if he or

she has received the proper training prior to implementation. An individual who has received training is likely to teach differently than one who has not received any training, and the attitude of the instructor impacts the attitudes of the children and other instructors (Christenson, 2002). Therefore, training is important for boosting self-confidence and increasing optimistic views of technology use.

A speech-language pathologist can use mobile technology to aid with his or her personal and professional organization as well. For example, the calendar application on the Apple iPad allows the speech-language pathologist to set reminders, organize therapy, and keep a schedule of meetings right at his or her fingertips (Fernandes, 2011). In addition, a speech-language pathologist can take voice recordings of his or her clients and use technology to take notes quickly during therapy sessions (Fernandes, 2011). Speech-language pathologists have reported that mobile technology devices are simple to transport and decrease clutter when traveling from one location to another (B. Butz, personal communication, March 22, 2013; A. Nichols, personal communication, March 11, 2013). Butz also noted that iPads are helpful when working with a group (personal communication, March 22, 2013). A therapist may have only one set of printed articulation cards but multiple iPads; the articulation cards on the iPad can be used rather than the print ones, which allows for an increased pace for group therapy (B. Butz, personal communication, March 22, 2013).

If the speech-language pathologist is using an iPad in therapy with a child whose caregivers also own an iPad, then the child can also work on similar tasks while at home (Fernandes, 2011). The speech-language pathologist can then have the child complete homework with his or her caregivers' iPad, which will help with increasing carryover into multiple settings. The iPads can also be used to communicate and work with the child's family

(Fernandes, 2011), which enables caregivers to have an increased responsibility in his or her child's therapy. Parents should be informed about his or her child's therapy goals, which allows them to utilize applications and games that "entertain and engage while teaching a concept" (Fernandes, 2011, p. 38).

Costs should also be considered when implementing technology in a therapy program; the cost of the technology often goes beyond the initial purchase of the device, depending on the types of devices purchased. Especially when working with children, some accessories are crucial in order to protect the device from damage (Fernandes, 2011). Screen protectors, stands, cases, and speakers are a few possible accessories that speech-language pathologists may want to purchase for their technology devices before placing them in the hands of children (Fernandes, 2011).

According to Fernandes (2011), the speech-language pathologist's use of technology to encourage speech and language skills is more important than the particular technology or application that is being used. As with games and activities that are not related to technology, technological games and activities can also be used in therapy sessions to promote certain language skills or reinforce productions. Many different types of technology and applications can be adapted for use in speech-language therapy sessions, and the speech-language pathologist can use his or her own creativity to determine how to use a particular application to provide the greatest benefit for the child (Fernandes, 2011).

When using technology for speech therapy, one must remember that speech-language therapy should still be well thought out and planned (Fernandes, 2011). Activities and reinforcement should still be appropriate and useful for the particular child with whom the speech-language pathologist is working; not every child will benefit from technology use.

Technological features are beneficial, but the knowledge of the speech-language pathologist cannot be replaced (Fernandes, 2011).

Conclusion

As technology continues to become more advanced, speech-language pathologists will continue to have the opportunity to incorporate many technological devices into their therapy sessions with children. Speech-language pathologists who are interested in implementing technology use in their therapy programs should begin by determining whether the technology will be engaging and will increase performance for the children. Then, he or she should determine which types of technology will benefit the children with whom he or she works and how to best use that technology to meet their needs. When used appropriately, technology can be an excellent supplement to a speech-language therapy program.

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**TECHNOLOGY USE IN SPEECH THERAPY WITH CHILDREN
INTERVIEW CONSENT FORM**


Date: 3/12/13

I hereby grant Carla Cotton permission to document responses to interview questions regarding the use of technology in speech therapy with children. I understand that some or all of the information I share with the interviewer will be included in a document regarding the use of technology in speech therapy programs. The interviewer has my permission to identify me with my responses through direct quotations and/or cited information from responses given to interview questions. When the final project is completed, the document will be made available to the public. The responses documented from the interview will be used solely for Carla Cotton's Undergraduate Honors Thesis at Ball State University, Technology Use in Speech Therapy with Children.

I understand that my participation in this interview is voluntary, and my responses may be included in the final document.

I understand that I have the right to refrain from responding to any questions asked that I do not wish to answer.


Signature of Interviewee


Signature of Interviewer

Annemarie Nichols, MA CCC-SLP
Name

Carla Cotton
Name

3/12/13
Date

3/12/13
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Brian A Butz
Signature of Interviewee

Carla Cotton
Signature of Interviewer

Brian Butz
Name

Carla Cotton
Name

3/22/13

Date

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Date